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New Application for Transmittal

Transmitted herewith for filing is the patent application of the following Inventor(s):
Joseph Kimler ;

For: SPRAYABLE INSECTICIDAL COMPOSITIONS HAVING ENHANCED EFFICACY

1. Papers enclosed which are required for a filing date under 35 CFR 1.53(b):

- 16 Pages of specification
☐ Sequence Listing (___ pages)
3 Pages of claims
1 Page(s) of abstract
Sheets of drawing
☐ Formal
☐ Informal

2. Additional papers enclosed

- ☒ Information Disclosure Statement
☒ Form PTO-1449
☒ Citations
☐ Declaration of Biological Deposit
☐ Computer Readable Form of Sequence Listing
☐ Declaration Under 37 CFR 1.821(f)
☐ Other:

3. Declaration

- ☒ Enclosed and executed by all inventor(s)
☐ Enclosed but not executed by all inventor(s)
☐ Not enclosed

~~~~~  
CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this paper and the documents referred to as enclosed therein are being deposited with the United States Postal Service on the date written below in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EL251676127US addressed to the Assistant Commissioner for Patents, Box Patent Application, Washington, D.C. 20231.

March 31, 1999  
Date

John W. Hogan, Jr.  
John W. Hogan, Jr.

4. Assignment

An assignment of the invention to:

AMERICAN CYANAMID COMPANY  
Five Giralda Farms  
Madison, New Jersey 07940-0874

- ☐ was made in the prior application and recorded in PTO on \_\_\_\_\_, Reel \_\_\_\_\_, Frame \_\_\_\_\_
- ☒ is attached under separate Recordation Form Cover Sheet.
- ☐ will follow.

5. Filing Fee Calculation

| CLAIMS AS FILED               |                        |                               |             |                  |
|-------------------------------|------------------------|-------------------------------|-------------|------------------|
| (1)<br>FOR                    | (2)<br>NUMBER<br>FILED | (3)<br>NUMBER EXTRA X<br>RATE |             | (4)<br>BASIC FEE |
|                               |                        |                               |             | \$760.00         |
| TOTAL CLAIMS                  | 20                     |                               | X \$ 18.00  |                  |
| INDEPENDENT<br>CLAIMS         | 2                      |                               | X \$ 78.00  |                  |
| MULTIPLE<br>DEPENDENCY<br>FEE |                        |                               | X \$ 260.00 |                  |
|                               |                        | Total Filing Fee:             |             | \$ 760.00        |

6. Method of Payment of Fees:

Charge Deposit Account No. 01-1300 in the amount of \$760.00

A duplicate of this transmittal is attached.

7. Instructions as to Overpayment:

Credit any overpayment to Deposit Account No. 01-1300.

8. General Authorization:

During the pendency of this application treat any reply requiring a petition for extension of time for its timely submission as containing a request therefor for the appropriate length of time. The Commissioner is hereby authorized to charge all required extension of time fees during the entire pendency of this application to Deposit Account No. 01-1300.

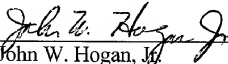
9. Authorization to Charge Additional Fees

- ☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Deposit Account No. 01-1300:
- ☒ 37 CFR 1.16(a), (f), or (g) filing fees
- ☒ 37 CFR 1.16(b), (c), and (d) presentation of extra claims
- ☒ 37 CFR 1.16(e) surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application.
- ☒ 37 CFR 1.17 application processing fees

10. Relate back (35 USC 119(e))

- ☒ Amend the Specification by inserting before the first line the sentence:

--This application claims priority from copending provisional application(s) serial number 60/080,117 filed on March 31, 1998.--



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33432-01

**SPRAYABLE INSECTICIDAL COMPOSITIONS**  
**HAVING ENHANCED EFFICACY**

**BACKGROUND OF THE INVENTION**

Control of cockroaches and other crawling insects is traditionally achieved by applying sprayable insecticidal formulations, diluted with water, to various microhabitats within the infested premises. In the control of crawling insect pests such as German cockroaches, which typically inhabit kitchens, food preparation areas and similar sites, these insecticidal formulations must be applied to a wide variety of substrates found in homes and commercial establishments. Many of these substrates, such as particle board or related composites, vinyl tiles or painted finishes, are highly porous, permitting the insecticidal formulation to be absorbed into the substrate where the active agent may become unavailable and fail to control the target insect pest.

Sprayable formulations such as emulsifiable concentrates, are widely known to readily penetrate porous substrates thereby becoming unavailable on the surface of porous substrates. Conventional suspension concentrate compositions of insecticides such as arylpyrroles, particularly chlorfenapyr are described e.g. in U.S. 5,496,845.

It is an object of this invention to provide sprayable insecticidal compositions having increased

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efficacy, particularly when applied to the surfaces of a variety of substrates found in homes, warehouses, commercial establishments and the like.

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SUMMARY OF THE INVENTION

It has now been found that a sprayable insecticidal composition which produces an abrasive, dislodgeable film or residue after spraying and drying, significantly enhances the efficacy of said insecticidal composition, particularly when applied to the surfaces of a variety of substrates found in homes, warehouses, commercial establishments and the like.

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The present invention provides a sprayable insecticidal composition which comprises an insecticidally effective amount of an insecticide; an abrasive; a low level of surfactant; an inert carrier; and optionally a film-forming inhibitor.

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The composition of the invention provides superior control of crawling insect pests when applied to the surface of a variety of substrates found in homes, warehouses, commercial establishments and the like.

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DETAILED DESCRIPTION OF THE INVENTION

Insecticides such as the arylpyrroles described in U.S. 5,310,938 are potent contact insecticides as well as highly potent insect stomach poisons and very efficacious when ingested by the target pestiferous insect. In crop protection practice, sprayable insecticidal compositions are effective in general because the target insect pest, in addition to directly contacting residues, ingests the

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insecticide while consuming the treated plant. However, surprisingly compositions of the present invention demonstrate increased efficacy in structural pest control practice over the conventional sprayable suspension concentrate composition of arylpyrrole insecticides.

Surprisingly, it has now been found that a sprayable insecticidal composition comprising an effective amount of an insecticide, such as an arylpyrrole insecticide, an abrasive, a low surfactant level, an inert carrier and optionally a film-forming inhibitor demonstrates a significantly enhanced efficacy against crawling insect pests such as cockroaches, ants, crickets, silverfish, earwigs, flour beetles, termites, wood-boring beetles and the like. The composition of the invention forms a dislodgeable, abrasive residue which attaches to, and irritates, the crawling insect pest as it passes through, or travels over, the treated surface. This adherence of the insecticidal residue promotes direct cuticular absorption of insecticide and, most significantly, indirectly ingestion as a result of the target insect pest grooming body parts such as antennae or tarsi in order to become free of the residual deposits. Advantageously, the composition of the invention demonstrates a superior effect to that of the conventional sprayable suspension concentrate insecticidal composition.

Among the insecticides suitable for use in the inventive composition are any known insecticides useful for the control of crawling insects, preferably arylpyrrole insecticides, particularly chlorfenapyr. In actual practice insecticidally effective amounts may depend upon a variety of

factors known to one of ordinary skill in the art e.g. potency of the active ingredient; typically the amount may be on a wt/wt basis about 10% - 70%, preferably 10% - 30%.

- 5           Abrasives suitable for use in the inventive composition may be silicate salts, such as an alkaline earth metal silicate or alkali metal silicate (preferably calcium silicate), or silica or kaolin clay or a mixture thereof, preferably calcium
- 10           silicate or kaolin clay or a mixture thereof, more preferably calcium silicate. The abrasive may suitably be present on a wt/wt basis of about 3% - 9%, preferably about 5% - 7%.

- Surfactants suitable for use in the composition
- 15           of the invention may be any known surface-active agent, wetting agent, dispersant, or a mixture thereof. A surface-active agent may be an emulsifying agent, a dispersing agent or a wetting agent; it may be non-ionic or ionic. Examples of
- 20           suitable surface-active agents include the sodium or calcium salts of polyacrylic acids and lignin sulphonic acids; formaldehyde condensates of alkylated naphthalene sulphonates such as MORWET® D425; Dioctyl sodium sulphosuccinate; the
- 25           condensation products of fatty acids of aliphatic amines or amides containing at least 12 carbon atoms in the molecule with ethylene oxide and/or propylene oxide; fatty acid esters of glycol, sorbitan, sucrose or pentaerythritol; condensates of these
- 30           with ethylene oxide and/or propylene oxide; condensation products of fatty alcohol or alkyl phenols, for example *p*-octylphenol or *p*-octylcresol, with ethylene oxide and/or propylene oxide; sulphates or sulphonates of these condensation

products; alkali or alkaline earth metal salts, preferably sodium salts, of sulphuric or sulphonic acid esters containing at least 10 carbon atoms in the molecule, for example sodium lauryl sulphate, sodium secondary alkyl sulphates, sodium salts of sulphonated castor oil, and sodium alkaryl sulphonates such as dodecylbenzene sulphonate; and polymers of ethylene oxide and copolymers of ethylene oxide and propylene oxide. Preferred surfactants include formaldehyde condensates of alkylated naphthalene sulphonates and dioctyl sodium sulphosuccinate. In actual practice, the level of surfactant may be higher in the presence of a film-forming inhibitor, than in the absence of said inhibitor. Suitable levels of a surfactant (in the absence of said inhibitor) on a wt/wt basis are levels below 8%, such as 2% - 7%, preferably 3% - 5%. In the absence of a film-forming inhibitor levels of surfactant below 8% are referred to herein as "low levels" of surfactant. In the presence of said film-forming inhibitor levels of surfactant may range as high as 15%, preferably 8% to 12% and are still considered "low levels" of surfactant herein. Compositions comprising a film-forming inhibitor and having less than about 8% surfactant are especially preferred.

The inert carrier suitable for use in the inventive composition may be any agriculturally acceptable solid or liquid carrier, preferably a solid carrier. Suitable solid carriers include natural and synthetic clays and silicates, for example natural silicas such as diatomaceous earths; magnesium silicates, for example talcs; magnesium aluminum silicates, for example attapulgitites and

vermiculites; aluminum silicates, for example kaolinites, montmorillonites and micas; calcium carbonate; calcium sulphate; ammonium sulphate; synthetic hydrated silicon oxides and synthetic calcium or aluminum silicates; elements, for example carbon and sulphur; natural and synthetic resins, for example coumarone resins, polyvinyl chloride, and styrene polymers and copolymers. Preferable solid carriers are kaolin clay, diatomaceous earth, montmorillonite clay, and the like, more preferably kaolin clay. In actual practice, the inert carrier may be present in the inventive composition on a wt/wt basis at about 25% - 75%, preferably about 55% - 65%.

The optional film-forming inhibitor suitable for use in the inventive composition may be any inert particulate material useful for the inhibition of the formation of a continuous film residue after the composition has been sprayed and dried.

Particularly useful are inorganic salts such as alkali metal halides or alkaline earth metal halides, preferably alkaline earth metal halides such as calcium chloride. The presence of an inorganic salt in the composition prohibits the formation of an uninterrupted film upon the drying of the composition residue. However, if the surfactant level of the composition is sufficiently low, the film-forming inhibitor is not required to obtain a dislodgeable residue. In actual practice, if present, the film-forming inhibitor is typically present on a wt/wt basis at about 1% - 6%, preferably about 2% - 4%.

The sprayable insecticidal compositions of the invention may be prepared by admixing an effective

amount of an insecticide such as chlorfenapyr, an abrasive such as a silicate salt, silica, kaolin clay or a mixture thereof, preferably a silicate salt such as calcium silicate, a low level of a surfactant such as an amount of less than 8% wt/wt, an inert carrier such as kaolin clay and optionally a film-forming inhibitor such as an inorganic salt and milling the mixture until homogeneous. It is important that a sprayable insecticidal formulation demonstrate minimal absorption so as to maximize the availability of an effective dose of the insecticide as the insect passes over or through treated areas.

The invention also provides for a method to control crawling insects comprising spraying in the locus of said crawling insects an effective amount of a composition of the invention. The locus of the crawling insect includes the insect and anywhere where the insect may crawl including, but not limited to, its habitat, breeding area, or food supply.

For a more clear understanding of the invention, the following examples are set forth below. These examples are merely illustrative and are not understood to limit the scope or underlying principles of the invention in any way.

Unless otherwise noted, all parts are parts by weight.

**EXAMPLE 1**

**Evaluation Of The Enhanced Efficacy Of A Sprayable  
Insecticidal Composition Containing An Abrasive**

5           The wettable powder compositions shown in Table  
I are prepared by combining all ingredients and  
milling until homogeneous.

**Table I**

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| <u>Ingredient</u>             | <u>wt/wt%</u> |          |          |          |          |          |          |
|-------------------------------|---------------|----------|----------|----------|----------|----------|----------|
|                               | <u>A</u>      | <u>B</u> | <u>C</u> | <u>D</u> | <u>E</u> | <u>F</u> | <u>G</u> |
| Chlorfenapyr                  | 72.0          | 56.6     | 41.1     | 25.7     | 25.2     | 24.8     | 24.8     |
| Wetting Agent <sup>1</sup>    | 2.5           | 2.5      | 2.5      | 2.5      | 2.5      | 2.5      | 2.5      |
| Dispersing Agent <sup>2</sup> | 4.5           | 4.5      | 4.5      | 4.5      | 4.5      | 17.5     | 4.5      |
| Calcium Chloride              | 1.0           | 1.0      | 1.0      | 1.0      | 1.0      | 1.0      | 1.0      |
| Calcium Silicate              | -             | -        | -        | -        | 2.0      | -        | -        |
| Kaolin Clay                   | 20.0          | 35.4     | 50.9     | 66.3     | 64.8     | 54.2     | 67.2     |

<sup>1</sup>MORWET® EFW, manufactured by Witco, Houston, TX

<sup>2</sup>MORWET® D425, manufactured by Witco, Houston, TX

15           In this evaluation, each of the above samples  
is dispersed in water and sprayed onto a glass  
surface so as to obtain a rate of 10 mg/M<sup>2</sup> of active  
ingredient. For each treatment, a group of 10  
German cockroaches (*Blattella germanica*) is placed  
on the sprayed glass surface and allowed to remain  
for a period of 1 hour or 6 hours. The cockroaches  
are then removed to clean jars and observed for  
20   mortality. Observation of mortality are made at 1,  
2 and 4 days after treatment (DAT). Each treatment  
is replicated three times. The data are averaged  
and shown in Table II.

Table II

| Test<br>Sample | % Mortality |       |       |       |       |       |
|----------------|-------------|-------|-------|-------|-------|-------|
|                | 1 DAT       |       | 2 DAT |       | 4 DAT |       |
|                | 1 hr.       | 6 hr. | 1 hr. | 6 hr. | 1 hr. | 6 hr. |
| I-A            | 30          | 20    | 30    | 25    | 35    | 35    |
| I-B            | 15          | 50    | 40    | 60    | 40    | 60    |
| I-C            | 30          | 50    | 35    | 65    | 40    | 70    |
| I-D            | 45          | 45    | 60    | 55    | 65    | 55    |
| I-E            | 85          | 95    | 95    | 95    | 100   | 95    |
| I-F            | 10          | 70    | 15    | 75    | 25    | 85    |
| I-G            | 60          | 95    | 90    | 95    | 95    | 100   |
| Untreated      | 0           | 0     | 0     | 0     | 0     | 0     |

As can be seen from the data shown on Table II,  
 5 addition of an abrasive such as calcium silicate  
 (I-E) and/or high levels of an abrasive such as  
 kaolin clay (I-G) significantly enhance the efficacy  
 of the sprayable insecticidal composition of the  
 invention. Further, it can be seen that a high  
 10 level of surfactant (I-F) decreases efficacy.

EXAMPLE 2

Evaluation Of The Efficacy Of Sprayable Insecticidal  
Compositions Containing Low Levels Of Surfactant And  
Comparative Evaluation Of Insecticidal Compositions  
Having A Low Level Of Surfactant Vs. A Conventional  
Sprayable Insecticidal Composition

The wettable powder compositions shown in Table  
III are prepared by combining all ingredients and  
milling until homogeneous.

Table III

| Ingredient                    | wt/wt% |      |      |      |      |      |      |      |      |
|-------------------------------|--------|------|------|------|------|------|------|------|------|
|                               | A      | B    | C    | D    | E    | F    | G    | H    | I    |
| Chlorfenapyr                  | 25.1   | 25.1 | 25.1 | 25.1 | 25.1 | 25.1 | 25.1 | 25.1 | 25.1 |
| Wetting Agent <sup>1</sup>    | 1.5    | 1.5  | 1.5  | 1.5  | 1.5  | 1.5  | 1.5  | 1.5  | 1.5  |
| Dispersing Agent <sup>2</sup> | 2.5    | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  |
| Calcium Chloride              | -      | 3.0  | 6.0  | -    | 30.  | 6.0  | -    | 3.0  | 6.0  |
| Calcium Silicate              | -      | -    | -    | 3.0  | 3.0  | 3.0  | 6.0  | 6.0  | 6.0  |
| Kaolin Clay                   | 70.9   | 67.9 | 64.9 | 67.9 | 64.9 | 61.9 | 64.9 | 61.9 | 58.9 |

<sup>1</sup>MORWET® EFW, manufactured by Witco, Houston, TX

<sup>2</sup>MORWET® D425, manufactured by Witco, Houston, TX

A suspension concentrate formulation (2SC) contain-  
ing 22.2% wt/wt of chlorfenapyr and essentially no  
abrasives is prepared as described in U.S. 5,496,845 and  
evaluated and compared as described hereinbelow.

In this evaluation, each of the above samples is  
dispersed in water and sprayed onto a glass surface so  
as to obtain a rate of 10 mg/M<sup>2</sup> of active ingredient.  
For each treatment, a group of 10 German cockroaches is  
placed on the sprayed glass surface for 1.25 hours and  
then removed and placed in clean glass jars. Observa-  
tions of mortality are made daily for 4 days after

treatment (DAT). Each treatment is replicated three times. The data are averaged and shown in Table IV.

5

Table IV

| <u>Test<br/>Sample</u> | <u>% Mortality</u> |              |              |              |
|------------------------|--------------------|--------------|--------------|--------------|
|                        | <u>1 DAT</u>       | <u>2 DAT</u> | <u>3 DAT</u> | <u>4 DAT</u> |
| III-A                  | 36.67              | 50.00        | 50.00        | 50.00        |
| III-B                  | 43.33              | 63.33        | 63.33        | 63.33        |
| III-C                  | 53.33              | 63.33        | 66.67        | 66.67        |
| III-D                  | 53.33              | 63.33        | 63.33        | 63.33        |
| III-E                  | 46.67              | 70.00        | 70.00        | 70.00        |
| III-F                  | 40.00              | 63.33        | 63.33        | 63.33        |
| III-G                  | 50.00              | 76.67        | 80.00        | 80.00        |
| III-H                  | 26.67              | 46.67        | 46.67        | 46.67        |
| III-I                  | 36.67              | 63.33        | 66.67        | 66.67        |
| 2SC                    | 10.00              | 16.67        | 16.67        | 16.67        |
| Untreated              | 3.33               | 3.33         | 3.33         | 3.33         |

As can be seen from the data shown in Table IV sprayable compositions having relatively low surfactant levels in combination with high levels of abrasive give increased efficacy, with (III-E) or without (III-G) calcium chloride. Also, as can be seen from the data shown in Table IV the compositions of the invention show significantly enhanced efficacy as compared to that of a conventional sprayable insecticidal composition (2 SC).

EXAMPLE 3

Comparative Evaluation Of The Efficacy Of Sprayable  
Insecticidal Compositions Of The Invention Vs. A  
Conventional Sprayable insecticidal Composition

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The wettable powder composition shown below is prepared by combining all of the ingredients and milling until homogeneous.

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Composition A

| <u>Ingredient</u>             | <u>wt/wt%</u> |
|-------------------------------|---------------|
| Chlorfenapyr                  | 25.9          |
| Wetting Agent <sup>1</sup>    | 1.5           |
| Dispersing Agent <sup>2</sup> | 2.5           |
| Calcium Chloride              | 3.0           |
| Calcium Silicate              | 6.0           |
| Kaolin Clay                   | 61.1          |
| <hr/>                         |               |
| <sup>1</sup> MORWET® EFW,     |               |
| <sup>2</sup> MORWET® D425     |               |

Composition B

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A suspension concentrate (2SC) composition containing 22.2% chlorfenapyr and essentially no abrasive is prepared according to U.S. 5,496,845 and evaluated and compared as described hereinbelow.

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In this evaluation, test compositions are dispersed in water and sprayed onto a masonite (porous substrate) or stainless steel surface (non-porous substrate) so as to obtain a rate of 100 mg/M<sup>2</sup> and a rate of 200 mg/M<sup>2</sup>. For each treatment, a group of 10 male German cockroaches are placed on the sprayed surface for a 1 hour period, then

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transferred to a clean glass jar. Observations of mortality are made at 1, 2 and 4 days after treatment (DAT). Each treatment is replicated 3 times. The data are averaged and shown in Table V.

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Table V

| <u>Test</u><br><u>Composition</u> | <u>Surface</u><br><u>Type</u> | <u>Rate</u><br><u>(mg/M<sup>2</sup>)</u> | <u>% Mortality</u> |              |              |
|-----------------------------------|-------------------------------|------------------------------------------|--------------------|--------------|--------------|
|                                   |                               |                                          | <u>1 DAT</u>       | <u>2 DAT</u> | <u>4 DAT</u> |
| A                                 | Masonite                      | 200                                      | 53                 | 80           | 88           |
| A                                 | Masonite                      | 100                                      | 15                 | 43           | 70           |
| A                                 | Stainless Steel               | 200                                      | 62                 | 83           | 95           |
| A                                 | Stainless Steel               | 100                                      | 33                 | 53           | 85           |
| B                                 | Masonite                      | 200                                      | 3                  | 25           | 48           |
| B                                 | Masonite                      | 100                                      | 8                  | 15           | 25           |
| B                                 | Stainless Steel               | 200                                      | 3                  | 25           | 63           |
| B                                 | Stainless Steel               | 100                                      | 8                  | 13           | 53           |

As can be seen from the data shown in Table V,  
10 the sprayable insecticidal composition of the  
invention (A) demonstrates significantly increased  
efficacy on crawling insects compared to the  
conventional sprayable insecticidal composition (B).  
This increased efficacy is demonstrated for both  
15 non-porous (stainless steel) and porous (masonite)  
substrates.

EXAMPLE 4

Comparative Evaluation Of The Efficacy Of Sprayable  
Insecticidal Compositions Of The Invention On A  
Variety Of Cockroach Species Vs. That of A  
Conventional Sprayable Insecticidal Composition

Using essentially the same procedure described hereinabove for Example 3 and employing a vinyl surface (very highly porous) sprayed with Test Compositions A and B as described in Example 3, at a rate of 100 mg/M<sup>2</sup>, three species of cockroaches were exposed for 1 hour, then placed in clean jars. Each treatment is replicated five times. Observations of mortality were made at 1 and 2 days after treatment. The data are averaged and shown in Table VI.

Insect Species Used

| <u>Common Name</u>   | <u>Scientific Name</u>        |
|----------------------|-------------------------------|
| American Cockroach   | <i>Periplaneta americana</i>  |
| Smokybrown Cockroach | <i>Periplaneta fuliginosa</i> |
| Oriental Cockroach   | <i>Blatta orientalis</i>      |

Table VI

| <u>Test<br/>Composition</u> | <u>Cockroach<br/>Species</u> | <u>% Mortality</u> |              |
|-----------------------------|------------------------------|--------------------|--------------|
|                             |                              | <u>1 DAT</u>       | <u>2 DAT</u> |
| A                           | American                     | 100                | 100          |
| A                           | Smokybrown                   | 68                 | 100          |
| A                           | Oriental                     | 88                 | 100          |
| B                           | American                     | 0                  | 0            |
| B                           | Smokybrown                   | 0                  | 7            |
| B                           | Oriental                     | 0                  | 47           |

As can be seen from the data in Table VI the insecticidal sprayable composition of the invention demonstrates significantly increased efficacy as compared to that of the conventional sprayable composition across a variety of species of cockroaches.

EXAMPLE 5

Comparative Evaluation Of The Efficacy Of Sprayable Insecticidal Compositions Of The Invention When Applied Directly To The Target Species Vs. That Of A Conventional Sprayable Insecticidal Composition

In this evaluation, dilutions of Test Composition A and B as described in Example 3 hereinabove are employed. Cockroach harborages are fashioned and infested with a group of mixed adult German cockroaches (5 males and 5 females), then the diluted Test Compositions are sprayed into the infested harborages. Each treatment is replicated 8 times. Observation of mortality are made 1 hour, 1 day and 4 days after treatment. The data are averaged and shown in Table VII.

Table VII

| <u>Test Composition</u> | <u>Concentration (wt/wt% av)</u> | <u>% Mortality</u> |              |               |
|-------------------------|----------------------------------|--------------------|--------------|---------------|
|                         |                                  | <u>1 hr.</u>       | <u>1 day</u> | <u>4 days</u> |
| A                       | 0.50                             | 38                 | 76           | 99            |
| A                       | 0.25                             | 25                 | 81           | 98            |
| B                       | 0.50                             | 15                 | 50           | 79            |
| B                       | 0.25                             | 10                 | 50           | 71            |

As can be seen from the data in Table VII, the sprayable insecticidal composition of the invention (A) demonstrates significantly increased efficacy upon direct contact with the insect than the conventional sprayable composition (B).

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I CLAIM:

1           1.    A sprayable insecticidal composition which  
2   comprises an insecticidally effective amount of an  
3   insecticide; an abrasive; a low level of surfactant;  
4   an inert carrier; and optionally a film-forming  
5   inhibitor.

1           2.    The composition according to claim 1  
2   wherein the insecticidally effective amount is about  
3   10% to 70% wt/wt.

1           3.    The composition according to claim 1  
2   wherein the low level of surfactant is about 2% to  
3   7% wt/wt.

1           4.    The composition according to claim 1  
2   wherein the insecticide is chlorfenapyr.

1           5.    The composition according to claim 1  
2   wherein the inert carrier is a solid.

1           6.    The composition according to claim 5  
2   wherein the solid carrier is kaolin clay.

1           7.    The composition according to claim 1  
2   wherein the abrasive is an alkaline earth metal  
3   silicate, an alkali metal silicate, silica, kaolin  
4   clay silicate or a mixture thereof.

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8. The composition according to claim 7 wherein the abrasive is calcium silicate, kaolin clay or a mixture thereof.

9. The composition according to claim 1 wherein the film-forming inhibitor is an inorganic salt.

10. The composition according to claim 9 wherein the inorganic salt is an alkaline earth metal halide or an alkali metal halide or a mixture thereof.

11. The composition according to claim 10 wherein the inorganic salt is calcium chloride.

12. The composition according to claim 8 wherein the abrasive is calcium silicate and is present at about 3% to 9% wt/wt.

13. The composition according to claim 12 wherein the kaolin clay is present at about 25% to 75% wt/wt.

14. The composition according to claim 13 wherein the film-forming inhibitor is calcium chloride and is present at about 1% to 6% wt/wt.

15. The composition according to claim 14 which comprises on a wt/wt basis about 20% to 30% chlorfenapyr; about 5% to 7% calcium silicate; about 3% to 5% surfactant; about 55% to 75% kaolin clay; and about 2% to 4% of calcium chloride.

1           16. A method for the control of crawling  
2 insects comprising spraying in locus of said  
3 crawling insects an effective amount of a  
4 composition of claim 1.

1           17. The method according to claim 16 wherein  
2 the crawling insects are selected from the group  
3 consisting of cockroaches, ants, crickets,  
4 silverfish, earwigs, flour beetles, termites, and  
5 wood boring beetles.

1           18. The method according to claim 17 wherein  
2 the crawling insect is a cockroach.

1           19. The method according to claim 16 wherein  
2 the composition is sprayed onto a porous substrate.

1           20. The method according to claim 16 wherein  
2 the composition comprises chlorfenapyr.

33432-01

SPRAYABLE INSECTICIDAL COMPOSITIONS  
HAVING ENHANCED EFFICACY

ABSTRACT OF THE INVENTION

There is provided a sprayable insecticidal composition having significantly increased efficacy which comprises an effective amount of an insecticide; an abrasive; a low level of a surfactant; an inert carrier; and optionally a film-forming inhibitor.

33432-01

**COMBINED DECLARATION AND POWER OF ATTORNEY**  
(Original, Design, Supplemental, Divisional, Continuation, CIP)

As the below named inventor, I hereby declare that:

**INVENTORSHIP IDENTIFICATION**

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

**TITLE OF INVENTION**

**SPRAYABLE INSECTICIDAL COMPOSITIONS HAVING ENHANCED EFFICACY**

**SPECIFICATION IDENTIFICATION**

the specification of which: (complete (a), (b), or (c))

- (a) ☒ is attached hereto.  
(b) ☐ was filed on \_\_\_\_\_ as  
    ☐ Serial Number \_\_\_\_\_  
    ☐ Express Mail No. \_\_\_\_\_, as Serial Number not yet known  
(c) ☐ was described and claimed in PCT International Application No. \_\_\_\_\_ filed on  
    and as amended under PCT Article 19 on \_\_\_\_\_ (if any).

**ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR**

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37 CFR 1.56(a).

PRIORITY CLAIM

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventors certificate or of any PCT International application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate of any PCT International application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

- (d) ☒ No such applications have been filed.  
(e) ☐ Such applications have been filed as follows.

NOTE: Where item (c) is entered above and the International Application which designated the U.S. claimed priority, check item (e), enter the details below and make the priority claim.

Earliest Foreign Application(s), if any, filed within 12 months (6 months for Design) prior to this U.S. Application

| Country | Application No. | Date of Filing<br>(Day, Month, Year) | Priority Claimed 35<br>USC 119 |
|---------|-----------------|--------------------------------------|--------------------------------|
|         |                 |                                      |                                |
|         |                 |                                      |                                |
|         |                 |                                      |                                |
|         |                 |                                      |                                |

All Foreign Application(s), if any, Filed More Than 12 Months  
(6 Months for Design) Prior to This U.S. Application)

CLAIM FOR BENEFIT OF PRIOR U.S. PROVISIONAL APPLICATION(S)  
(35 U.S.C. § 119(E))

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

PROVISIONAL APPLICATION NUMBER

FILING DATE

60/080117

March 31, 1998

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

|                             |                        |
|-----------------------------|------------------------|
| <u>William H. Calnan</u>    | <u>Reg. No. 29,520</u> |
| <u>Charles F. Costello</u>  | <u>Reg. No. 27,324</u> |
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- ☐ Attached as part of this declaration and power of attorney is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

**SEND CORRESPONDENCE AND TELEPHONE CALLS TO:**

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**CLAIM FOR BENEFIT OF EARLIER U.S./PCT APPLICATION(S)  
UNDER 35 U.S.C. 120**

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I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, Section 1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT International filing date of this application.

**PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS  
DESIGNATING THE U.S. FOR BENEFIT UNDER 35 USC 120**

| U.S. Applications                        |                  | Status (Check One)                   |                          |                          |
|------------------------------------------|------------------|--------------------------------------|--------------------------|--------------------------|
| U.S. Applications                        | U.S. Filing Date | Patented                             | Pending                  | Abandoned                |
| 1.                                       |                  | <input type="checkbox"/>             | <input type="checkbox"/> | <input type="checkbox"/> |
| 2.                                       |                  | <input type="checkbox"/>             | <input type="checkbox"/> | <input type="checkbox"/> |
| <b>PCT Applications Designating U.S.</b> |                  |                                      |                          |                          |
| PCT APPLICATION NO.                      | PCT FILING DATE  | U.S. SERIAL NO.<br>ASSIGNED (if any) |                          |                          |
| 3.                                       |                  |                                      |                          |                          |
| 4.                                       |                  |                                      |                          |                          |

DECLARATION

I hereby declare that all statements herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

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